1. C = normal  c = disease  Father:  CC homozygous dominant

2. G = normal  g = disease  Mother: Gg heterozygous

3. Genotypes 1: 1 (SS:Ss)

Phenotypes 1:1 (half normal for sickle cell/prone to malaria; half symptoms of sickle cell/resistant to malaria

4. S = normal  s = disease  Mother: ss  Father: Ss

5. H = disease  h = normal  Father: Hh  Mother hh

6. Codominance

TT = two pronged spines  OO = One pronged spines  TO = Mixed spines (one and two prongs)

1/4 TT (25%) : 2/4 TO (50%) : 1/4 OO (25%)

7. Incomplete dominance

BB = Blue  BY = Green  YY = Yellow

1/4 BB (25%) : 2/4 BY (50%) : 1/4 YY (25%)

8. "Calico" needs a copy of EACH $X^B$ allele and $X^O$ allele since it is a codominant pattern. Males only ever get one copy of an X-chromosome…so can NEVER have a genotype $X^B X^O$

9. Mother was a carrier of hemophilia ($XX^h$)which is X-linked recessive. Mother passed on the trait to her daughter and son but ONLY the son expresses the disease, while the daughter is a carrier.

10. OO = OUT OF LUCK ☹ Blood groups A & B are Codominant to each other, and both dominant to O blood type; This represents a form of "Multiple Alleles" inheritance.

| **Patients** | **Donors** |
|---|---|
| AA | AA |
| AO | AB |
| OO | BO |
| BB | |
| BO | |

11.

| Genotypes: | sSbB | sSbb | ssbb | ssbB |
|---|---|---|---|---|
| Phenotypes: | Short/Black | Short/Red | Long /Red | Long/Black |
| | 25% | 25% | 25% | 25% |

12. Same results as #11